*भारतीय मानक*
*Indian Standard*

**IS 17871 : 2022**

# स्वचल वाहन — मापन पद्धति — ध्वनि उत्सर्जन के संबंध में दो और तीन पहिया वाहनों के लिए गैर-मूल प्रतिस्थापन धुएं निकास की साइलेंसिंग सिस्टम (नोरेस)

# Automotive Vehicle — Method of Measurement — Non-original Replacement Exhaust Silencing Systems (NORESS) for Two and Three Wheeled Vehicles with Regard to Sound Emission

ICS 17.140.30

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Automotive Braking and Steering Systems, Vehicles Testing and Performance Evaluation Sectional Committee, TED 04

## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Braking and Steering Systems, Vehicles Testing and Performance Evaluation Sectional Committee had been approved by the Transport Engineering Division Council.

This standard covers the approval procedure for non-original replacement exhaust silencing systems (NORESS) for two and three wheeled vehicles with regard to the sound emission.

The testing procedure for NORESS of noise measurement shall be as per:

| | |
|---|---|
| IS 10399 : 2022 | Automotive vehicles — Noise emitted by stationary vehicles — Method of measurement (*second revision*) |
| IS 3028 (Part 1) : 2018 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 1 L2 category |
| IS 3028 (Part 2) : 2022 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 2 Other than L2 and L5 category |
| IS 3028 (Part 3) : 2018 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 3 L5 category |

While formulating this standard reference is drawn from UN ECE R92 (E/ECE/324/Rev.1/Add.91/Rev.1/Amend.3−E/ECE/TRANS/505/Rev.1/Add.91/Rev.1/Amend.3)

The composition of the committee responsible for preparation of this standard is given in Annex B.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’.

# *Indian Standard*

# AUTOMOTIVE VEHICLE — METHOD OF MEASUREMENT — NON-ORIGINAL REPLACEMENT EXHAUST SILENCING SYSTEMS (NORESS) FOR TWO AND THREE WHEELED VEHICLES WITH REGARD TO SOUND EMISSION

## 1 SCOPE

This standard applies to approval of non-original replacement exhaust silencing systems for L1, L2 and L5 category vehicles as defined in IS 14272.

## 2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

| *IS No.* | *Title* |
|---|---|
| 3028 (Part 1) : 2018 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 1 L2 category |
| 3028 (Part 2) : 2022 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 2 Other than L2 and L5 category |
| 3028 (Part 3) : 2018 | Automotive vehicles — Noise emitted by moving vehicles — Specification and method of measurement: Part 3 L5 category |
| 10399 : 2022 | Automotive vehicles — Noise emitted by stationary vehicles — Method of measurement (*second revision*) |
| 11422 : 2001 | Terms and definitions of weights of two wheeled motor vehicles (*first revision*) |
| 14272 : 2011 | Automotive vehicles — Types — Terminology (*first revision*) |
| 14599 : 1999 | Automotive vehicles—Performance requirements (measurement of power, SFC, opacity) of positive and compression ignition engines — Method of test |

## 3 DEFINITIONS

For the purpose of this standard following definitions shall apply:

**3.1 Non-Original Replacement Exhaust System or Components of this System** — A system of a type different from that fitted to the vehicle on approval or extension of approval. It may be used only as a replacement exhaust or silencing system.

The acronym 'NORESS' denotes the non-original replacement exhaust silencing system.

**3.2 Non-Original Replacement Exhaust System Component —** One of the various components which together form the exhaust system.

NOTE — Those components are, in particular, the exhaust manifold, the silencer proper, the expansion chamber and the resonator.

**3.3 Non-Original Replacement Exhaust Systems of Different Types** – Silencing systems which differ significantly in such respects as:

a) Their components bear different trade names or marks;

b) The characteristics of the materials constituting a component are different or the components differ in shape or size;

NOTE — A modification in respect to coating (zinc coating, aluminium coating, etc) shall not be considered a change of type.

c) The operating principles of at least one component are different; and

d) Their components are combined differently.

**3.4 Non-Original Replacement Exhaust System (NORESS) or Component thereof** — Any part of the exhaust silencing system defined in **3.1** intended for use on a vehicle other than a part of the type fitted to the vehicle when submitted for type approval pursuant to this standard.

**3.5 Approval of a Non-Original RESS (NORESS) or Component(s) thereof** — The approval of the whole or a part of a silencing system adaptable to one or several specified types of two and three wheeled vehicle, as regards the limitation of their noise level.

**3.6 Two and Three Wheeled Vehicle Type** — Vehicles which do not differ in such essential respects as:

a) The type of engine (two-stroke or four-stroke with reciprocating or rotary pistons; number and capacity of cylinders; number and type of carburettors or injection systems; arrangement of valves; maximum net power and corresponding engine speed). For rotary piston engines, the cubic capacity should be taken to be double of the volume of the chamber;

b) Drive train, in particular the number and ratio of gears of the transmission and the final ratio; and

c) Number, type and arrangement of exhaust silencing systems.

## 4 APPLICATION FOR APPROVAL

**4.1** The application for approval of a NORESS or components thereof shall be submitted by its manufacturer or by his duly accredited representative (*see* Annex A).

**4.2** It shall be accompanied by the under mentioned documents in triplicate and the following particulars:

a) A description of the vehicle type(s) on which the NORESS or components are intended to be fitted, with regard to the items referred to in **3.6**. The numbers and/or symbols identifying the engine type and the vehicle type shall be specified and the vehicle type approval number, if necessary;

b) A description of the complete NORESS showing the relative position of each of its components, together with instructions for their assembly; and

c) Detailed drawings of each NORESS component to enable it to be easily located and identified, and specification of the materials used.

**4.3** At the request of the testing agency conducting the tests for approval, the manufacturer of the NORESS shall submit:

a) Two samples of the NORESS or its components submitted for approval;

b) A sample of the original exhaust silencing system with which the vehicle was equipped when submitted for type approval; and

c) A test vehicle representative of the type to which the NORESS is to be fitted. This vehicle, when measured for noise emission according to the methods described in IS 3028 (Part 1), IS 3028 (Part 2), IS 3028 (Part 3) and IS 10399 as amended from time to time shall satisfy the following conditions:

    1) The noise level, during the test in motion shall not exceed the limit specified in Rule 120 of Central Motor Vehicle Rules, 1989 by more than 1 dB(A); and

    2) The sound level during the stationary test shall not exceed by more than 3 dB(A) from the level determined during the stationary noise approval as and when notified in Central Motor Vehicle Rules, 1989.

## 5 MARKINGS

**5.1** Each component of the NORESS, excluding pipes and fitting accessories, shall bear:

a) The trade name or mark of the manufacturer of the NORESS and its components; and

b) The commercial designation given by the manufacturer.

**5.2** These markings shall be clearly legible and indelible and also visible in the position at which the NORESS is fitted.

**5.3** The NORESS shall be labelled by its manufacturer; indicating the type(s) of vehicle(s) for which it has been granted the approval.

**5.4** The NORESS shall be supplied in a packaging or carry a label both providing the following particulars:

a) The trade name or mark of the manufacturer of the replacement silencing system and its components;

b) The address of the manufacturer or his representative; and

c) A list of vehicle model(s) for which the NORESS is intended.

**5.5** The manufacturer shall provide:

a) Instructions explaining in detail the correct method of mounting on the vehicle;

b) Instructions for handling the silencing system; and

c) A list of components with the numbers of the corresponding parts, excluding retainers.

## 6 APPROVAL OF VEHICLE

**6.1** If the NORESS or component thereof submitted for approval under this standard meets the requirements of **7**, approval for that type shall be granted.

**6.2** An approval number shall be assigned to each NORESS type approved.

**6.3** The approval mark shall be easily legible when the NORESS is fitted to the vehicle, and shall be indelible.

## 7 SPECIFICATIONS

### 7.1 General Specifications

The silencer shall be designed, constructed and capable of being mounted so that:

a) The vehicle complies with the requirements of this standard under normal conditions of use, and in particular regardless of any vibrations to which it may be subjected;

b) It displays reasonable resistance to the corrosion phenomena to which it is exposed, with due regard to the normal conditions of use of the vehicle;

c) The ground clearance provided by the silencer originally fitted, and the possible inclined position of the vehicle are not reduced;

d) Unduly high temperatures do not exist at the surface;

e) Its edges are not sharp or jagged and there is sufficient space for shock absorbers and springs;

f) Adequate clearance of spring parts is provided;

g) Adequate safety clearance of pipes is provided; and

h) It is tamper-resistant in a way that is compatible with clearly defined maintenance and installation requirements.

**7.1.1** Additional prescriptions related to tamper-ability and manually adjustable multimode exhaust or silencing systems are:

a) All exhaust or silencing systems shall be constructed in a way that does not easily permit removal of baffles, exit-cones and other parts whose primary function is as part of the silencing/expansion chambers. Where incorporation of such a part is unavoidable, its method of attachment shall be such that removal is not facilitated easily (for example, with conventional threaded fixings) and should also be attached such that removal causes permanent/irrecoverable damage to the assembly; and

b) Exhaust or silencing systems with multiple, manually adjustable operating modes shall meet all requirements in all operating modes. The reported noise levels shall be those resulting from the mode with the highest noise levels.

### 7.2 Specifications Regarding Noise Levels

The acoustic efficiency of the NORESS or components thereof shall be verified by means of the methods described in in IS 3028 (Part 1), IS 3028 (Part 2), IS 3028 (Part 3) and IS 10399 as amended from time to time. In particular, for the application of **7.2** reference shall be made to IS 3028 and IS 10399 which was in force at the time of type approval of the new vehicle. When the NORESS or its components is fitted to the two and three wheeled vehicle described in **4.3(c)**, the noise level values obtained using the two methods (stationary and vehicle in motion) shall not exceed the values measured in conformity with the requirements of **4.3(c)**, for the same vehicle when fitted with the original silencing system during the test with the vehicle in motion and the stationary test.

### 7.3 Prohibition of Defeat Devices

The NORESS manufacturer shall not intentionally alter, adjust or introduce any device or procedure solely for the purpose of fulfilling the noise emission requirements of this standard, which will not be operational during typical on-road operation.

### 7.4 Measurement of Vehicle Performance

**7.4.1** The NORESS or its components shall be such as to ensure that the vehicle’s performance is comparable with that achieved with the original exhaust silencing system or components thereof.

**7.4.2** The NORESS or, at the manufacturer’s choice, the components thereof shall be compared with an original silencing system or components, also in new condition, successively fitted to the vehicle referred to in **4.3(c)**.

**7.4.3** The verification shall be carried out by measuring the output curve in accordance with **7.4.4.1** or **7.4.4.2**. The maximum power and the maximum power speed measured with the NORESS shall not exceed the net power and the speed measured under the conditions set out below with the original equipment exhaust system by more than ±5 percent.

**7.4.4** *Test Method*

**7.4.4.1** *Engine test method*

The measurements shall be carried out on the engine of the vehicle referred to in **4.3(c)**, the engine being mounted on a dynamometer.

**7.4.4.2** *Vehicle test method*

The measurements shall be carried out on the vehicle referred to in **4.3(c)**. The values obtained with the original silencing system shall be compared with those obtained with the NORESS. The test shall be conducted on a roller dynamometer.

### 7.5 Evaluation of the Emission of Pollutants of Vehicles Equipped with Replacement Silencer System

The vehicle referred to in **4.3(c)** exhaust silencing system (NORESS) of the type for which approval is requested, shall fulfil the emission requirements according to the type approval of the vehicle. The evidence shall be documented in the test report.

### 7.6 Additional Sound Emission Provisions (ASEP)

**7.6.1** The ASEP requirements shall also be fulfilled for the NORESS, as and when notified in CMVR. This requirement shall be applicable for only those vehicles which are tested for ASEP test during type approval.

**7.6.2** Additional provisions regarding the NORESS or its components filled with fibrous materials shall be as and when notified in Central Motor Vehicle Rules, 1989 for vehicle type approval.

## 8 MODIFICATION AND EXTENSION OF THE APPROVAL OF NORESS AND EXTENSION OF APPROVAL

**8.1** Every modification of the type of NORESS or its components shall be notified to the test/certifying agency which had type approved the type of NORESS. The test/certifying agency may then either:

a) Consider that the modifications made are unlikely to have an appreciable adverse effect; or

b) Carry out a further test based on the modifications which may affect the engine/vehicle performance.

**8.2** The manufacturer of the NORESS or component thereof or his duly accredited representative may ask the test/certifying agency which has granted the approval of the NORESS for one or several types of vehicle for an extension of the approval to other types of vehicle. The procedure for this shall be as described in **4**.

# ANNEX A

(*Clause* 4.1)

## INFORMATION TO BE SUBMITTED BY NON-ORIGINAL REPLACEMENT EXHAUST SILENCING SYSTEMS (NORESS) MANUFACTURER

### A-1 TRADE NAME OR MARK OF THE VEHICLE

### A-2 VEHICLE TYPE

**A-2.1 Vehicle Commercial Name/Variants:**

### A-3 DETAILS OF THE VEHICLE USED FOR TEST

**A-3.1 Kerb Mass: ………….. kg**

**A-3.2 Gears Used for Test of Vehicle in Motion:**

### A-4 ENGINE

**A-4.1 Manufacturer:**

**A-4.2 Cycles: two-stroke/four-stroke:**

**A-4.3 Cylinder Capacity (cm$^3$):**

**A-4.4 Type of Engine (For Example, Positive-ignition, Compression Ignition etc):**

**A-4.5 Rated Maximum Net Power…..kW at…../min**

### A-5 TRANSMISSION

**A-5.1 Type of Transmission: Non-automatic Gearbox/Automatic Gearbox:**

**A-5.2 Number of Gears:**

### A-6 NORESS EQUIPMENT

**A-6.1 Name and Address of NORESS Manufacturer or his Authorized Representative (if any):**

**A-6.2 Exhaust Silencer**

**A-6.2.1** *Model:*

**A-6.2.2** *Type (in accordance with drawing/part No).*

# ANNEX B

(*Foreword*)

## COMMITTEE COMPOSITION

Automotive Braking and Steering Systems, Vehicles Testing and Performance Evaluation Sectional Committee, TED 04

| *Organization* | *Representative(s)* |
|---|---|
| National Automotive Testing and R & D Infrastructure Project (NATRAX), Indore | Dr N. Karuppaiah (***Chairman***) |
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| Association of State Road Transport Undertakings, New Delhi | Shri R. Chandrababu<br>Shri Ulhas Babu (*Alternate*) |
| Automotive Component Manufacturers Association of India, New Delhi | Shri Uday Harite<br>Shrimati Seema Babbal (*Alternate*) |
| Automotive Research Association of India, Pune | Shri A. Akbar Badusha<br>Shri P. D. Betgeri (*Alternate* I)<br>Shri Konaki Ramu (*Alternate* II) |
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| Continental Automotive Components (India) Pvt Ltd, Gurugram | Shri Rahul Mare<br>Shri Raghavendra Hariharan (*Alternate* I)<br>Shri Balaji Prabhakar (*Alternate* II) |
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| VE Commercial Vehicles, Pithampur | Shri Shyam Bute<br>Shri Mohan Kumar Muthusamy (*Alternate*) |
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